CLAIMS

We claim:

1. A cellular communication system, comprising:

a plurality of base station transceivers;

at least one base station controller that is configured to control the plurality of base station transceivers; and

a cell group that comprises a plurality of cells that are respectively associated with the plurality of base station transceivers and with a plurality of primary frequencies, such that in each of the plurality of cells the respectively associated base station transceiver uses the respectively associated primary frequency to communicate control information, communication of the control information being constrained to the respectively associated primary frequency, and uses coordinated frequency hopping over the plurality of primary frequencies to communicate traffic information.

2. The cellular communication system as recited in Claim 1, wherein the coordinated frequency hopping is cyclical.

3. The cellular communication system as recited in Claim 1, wherein the coordinated frequency hopping is random.

4. The cellular communication system as recited in Claim 1, wherein each of the plurality of cells has predefined control time slots associated therewith that are used to communicate the control information and has predefined traffic time slots associated therewith that are used to communicate the traffic information and at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different primary frequencies.

5. The cellular communication system as recited in Claim 1, wherein the primary frequencies are non-contiguous.

6. The cellular communication system as recited in Claim 1, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of primary frequencies.

7. The cellular communication system as recited in Claim 6, wherein the primary frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system.

8. The cellular communication system as recited in Claim 1, further comprising:

a global positioning system (GPS) satellite that communicates with the plurality of base station transceivers to synchronize the cellular communication system.

9. A cellular communication system, comprising:

a base station subsystem; and

a mobile terminal that is configured to use a control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency, and is configured to use coordinated frequency hopping over a plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

10. The cellular communication system as recited in Claim 9, wherein the control information is exchanged during predefined control time slots and the traffic information is exchanged during predefined traffic time slots and at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies.

11. The cellular communication system as recited in Claim 9, wherein the coordinated frequency hopping is cyclical.

12. The cellular communication system as recited in Claim 9, wherein the coordinated frequency hopping is random.

13. The cellular communication system as recited in Claim 9, wherein the base station subsystem is configured to transmit a hopping sequence to the mobile terminal using the control frequency.

14. The cellular communication system as recited in Claim 9, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive.

15. The cellular communication system as recited in Claim 9, wherein the traffic frequencies are non-contiguous.

16. The cellular communication system as recited in Claim 9, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies.

17. The cellular communication system as recited in Claim 16, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system.

18. The cellular communication system as recited in Claim 9, wherein the plurality of traffic frequencies comprise the control frequency.

19. A method of communication between a mobile terminal and a base station subsystem, comprising:

assigning a control frequency to a cell in which the mobile terminal is located;

using the control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency;

assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located; and

using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

20. The method as recited in Claim 19, wherein the control information is exchanged during predefined control time slots and the traffic information is exchanged during predefined traffic time slots and at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies.

21. The method as recited in Claim 19, wherein the coordinated frequency hopping is cyclical.

22. The method as recited in Claim 19, wherein the coordinated frequency hopping is random.

23. The method as recited in Claim 19, further comprising:

transmitting a hopping sequence to the mobile terminal using the control frequency.

24. The method as recited in Claim 23, wherein transmitting the hopping sequence to the mobile terminal using the control frequency comprises:

transmitting the hopping sequence to the mobile terminal using a primary packet broadcast control channel (PBCCH), which is defined by the control frequency and at least one time slot.

25. The method as recited in Claim 19, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive.

26. The method as recited in Claim 19, wherein the traffic frequencies are non-contiguous.

27. The method as recited in Claim 26, wherein using the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem comprises:

encoding a single code-word over at least a pair of the non-contiguous traffic frequencies.

28. The method as recited in Claim 19, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies.

29. The method as recited in Claim 28, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system.

30. The method as recited in Claim 19, further comprising:

assigning an alternative control frequency to the cell in which the mobile terminal is located;

using the alternative control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the alternative control frequency;

assigning a plurality of alternative traffic frequencies to the cell in which the mobile terminal is located; and

using coordinated frequency hopping over the plurality of alternative traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

31. The method as recited in Claim 19, wherein each of the plurality of traffic frequencies is associated with an equivalence class of frequencies and wherein using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem comprises:

randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and

using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem.

32. The method as recited in Claim 19, wherein the plurality of traffic frequencies comprise the control frequency.

33. A computer program product for facilitating communication between a mobile terminal and a base station subsystem, comprising:

a computer readable storage medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code for assigning a control frequency to a cell in which the mobile terminal is located;

computer readable program code for using the control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency;

computer readable program code for assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located; and

computer readable program code for using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

34. The computer program product as recited in Claim 33, wherein the control information is exchanged during predefined control time slots and the traffic information is exchanged during predefined traffic time slots and at least one idle time slot separates at least one of the predefined control time slots from at least one of the predefined traffic time slots, which are associated with different frequencies.

35. The computer program product as recited in Claim 33, wherein the coordinated frequency hopping is cyclical.

36. The computer program product as recited in Claim 33, wherein the coordinated frequency hopping is random.

37. The computer program product as recited in Claim 33, further comprising:

computer readable program code for transmitting a hopping sequence to the mobile terminal using the control frequency.

38. The computer program product as recited in Claim 37, wherein the computer readable program code for transmitting the hopping sequence to the mobile terminal using the control frequency comprises:

computer readable program code for transmitting the hopping sequence to the mobile terminal using a primary packet broadcast control channel (PBCCH), which is defined by the control frequency and at least one time slot.

39. The computer program product as recited in Claim 33, wherein the plurality of traffic frequencies and the control frequency are mutually exclusive.

40. The computer program product as recited in Claim 33, wherein the traffic frequencies are non-contiguous.

41. The computer program product as recited in Claim 40, wherein the computer readable program code for using the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem comprises:

computer readable program code for encoding a single code-word over at least a pair of the non-contiguous traffic frequencies.

42. The computer program product as recited in Claim 33, wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies.

43. The computer program product as recited in Claim 42, wherein the traffic frequencies are non-contiguous and are each separated, one from another, by at least one of the frequencies associated with the auxiliary cellular communication system.

44. The computer program product as recited in Claim 33, further comprising:

computer readable program code for assigning an alternative control frequency to the cell in which the mobile terminal is located;

computer readable program code for using the alternative control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency;

computer readable program code for assigning a plurality of alternative traffic frequencies to the cell in which the mobile terminal is located; and

computer readable program code for using coordinated frequency hopping over the plurality of alternative traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

45. The computer program product as recited in Claim 33, wherein each of the plurality of traffic frequencies is associated with an equivalence class of frequencies and wherein the computer readable program code for using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem comprises:

computer readable program code for randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and

computer readable program code for using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem.

46. The computer program product as recited in Claim 33, wherein the plurality of traffic frequencies comprise the control frequency.

47. A cellular communication system, comprising:

a plurality of base station transceivers;

at least one base station controller that is configured to control the plurality of base station transceivers; and

a cell group that comprises a plurality of cells that are respectively associated with the plurality of base station transceivers and with a plurality of control frequencies, such that in each of the plurality of cells the respectively associated base station transceiver uses the respectively associated control frequency to communicate control information, communication of the control information being constrained to the respectively associated control frequency, and uses coordinated frequency hopping over the plurality of traffic frequencies to communicate traffic information, the plurality of control frequencies and the plurality of traffic frequencies being mutually exclusive.

48. A cellular communication system, comprising:

a base station subsystem; and

a mobile terminal that is configured to use a control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency, and is configured to use coordinated frequency hopping over a plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem;

wherein frequencies associated with an auxiliary cellular communication system coexist within a same bandwidth defined by the plurality of traffic frequencies.

49. A method of communication between a mobile terminal and a base station subsystem, comprising:

assigning a control frequency to a cell in which the mobile terminal is located;

using the control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency;

assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located;

using coordinated frequency hopping over the plurality of traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem;

assigning an alternative control frequency to the cell in which the mobile terminal is located;

using the alternative control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the alternative control frequency;

assigning a plurality of alternative traffic frequencies to the cell in which the mobile terminal is located; and

using coordinated frequency hopping over the plurality of alternative traffic frequencies to exchange traffic information between the mobile terminal and the base station subsystem.

50. A method of communication between a mobile terminal and a base station subsystem, comprising:

assigning a control frequency to a cell in which the mobile terminal is located;

using the control frequency to exchange control information between the mobile terminal and the base station subsystem, the exchange of control information being constrained to the control frequency;

assigning a plurality of traffic frequencies to the cell in which the mobile terminal is located, each of the plurality of traffic frequencies being associated with an equivalence class of frequencies;

randomly selecting a frequency from each of the plurality of equivalence classes of frequencies; and

using the randomly selected frequencies to communicate traffic information between the mobile terminal and the base station subsystem.